SCHAWK summarizes the classification of soluble fibres and their effects on human health. Different fibres vary in the amounts and ratio of SCFA produced, as well as the rate at which they are fermented. Carbohydrates, fibre, fat, fatty acids, cholesterol, protein, and amino acids. Washington, D.C., USA: The National Academies Press; 2002.

It is well recognized that fibre is important for normal laxation. This is due primarily to the ability of fibre to increase stool weight. The increased weight is due to the physical presence of the fibre itself, water held by the fibre, and increased bacterial mass from fermentation. Unlike in the United States, the following fibres can be used as ingredients in Canada, but according to labeling regulations, do not contribute to the total fibre value found in the Nutrition Facts table.

The mechanism for the cholesterol-lowering effects of soluble fibre is likely the presence of a large number of short-chain fatty acids (SCFA). SCFA are produced by the fermentation of dietary fibre by bacteria such as bifidobacteria and lactobacilli. Different fibres vary in the amounts and ratio of SCFA produced, as well as the rate at which they are fermented.

In humans, FOS (fructo-oligosaccharides) are partially fermented and utilized by the bacteria in the large intestine. SCFAs produced from non-viscous, fermentable fibres may stimulate release of insulin from the pancreas and alter glycogen breakdown by the liver and so play a role in glucose metabolism. Resistant starch and nonstarch polysaccharides improve nonspecific immunity after intestinal resection in rats. FOS are resistant to stomach and upper intestinal digestion but are partially fermented in the distal colon. SCFAs are produced in the distal colon from the fermentation of fibre by the gut microflora. Oligofructose consumption was found to reduce febrile illness associated with diarrhea or respiratory events, and reduce antibiotic use in infants.


1. Wheat Bran Fibre is the Best Fibre for Promoting Regularity
4. In addition, SCFAs produced from non-viscous, fermentable fibres may stimulate release of insulin from the pancreas and alter glycogen breakdown by the liver and so play a role in glucose metabolism.

Table 2

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Effect on Cholesterol</th>
<th>Effect on Insulin</th>
<th>Effect on Glycogen Breakdown</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-glucan</td>
<td>-0.5</td>
<td>+0.2</td>
<td>+0.3</td>
</tr>
<tr>
<td>Fructooligosaccharides</td>
<td>-0.3</td>
<td>+0.1</td>
<td>-0.2</td>
</tr>
<tr>
<td>Psyllium</td>
<td>-0.4</td>
<td>+0.3</td>
<td>+0.1</td>
</tr>
<tr>
<td>Some gums</td>
<td>-0.3</td>
<td>+0.2</td>
<td>-0.1</td>
</tr>
<tr>
<td>Some hemicelluloses</td>
<td>-0.2</td>
<td>+0.1</td>
<td>+0.0</td>
</tr>
<tr>
<td>Psyllium</td>
<td>-0.4</td>
<td>+0.3</td>
<td>+0.1</td>
</tr>
<tr>
<td>Some gums</td>
<td>-0.3</td>
<td>+0.2</td>
<td>-0.1</td>
</tr>
<tr>
<td>Some hemicelluloses</td>
<td>-0.2</td>
<td>+0.1</td>
<td>+0.0</td>
</tr>
</tbody>
</table>

Health Benefits of Dietary Fibre

High fibre intake is associated with a lower prevalence of coronary heart disease. This may be due to the modifying effect certain fibres have on serum cholesterol levels, fibrinogen level, platelet aggregation, and the production of acute phase proteins. A meta-analysis of 20 studies involving 54,848 individuals concluded that dietary fibre intake was associated with a lower risk of coronary heart disease.

Table 3

<table>
<thead>
<tr>
<th>Fiber Type</th>
<th>Decrease in LDL-Cholesterol (mg/dL)</th>
<th>Increase in HDL-Cholesterol (mg/dL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>β-glucan</td>
<td>-15</td>
<td>+10</td>
</tr>
<tr>
<td>Pectin</td>
<td>-12</td>
<td>+8</td>
</tr>
<tr>
<td>Psyllium</td>
<td>-13</td>
<td>+12</td>
</tr>
<tr>
<td>Some gums</td>
<td>-10</td>
<td>+15</td>
</tr>
<tr>
<td>Some hemicelluloses</td>
<td>-8</td>
<td>+20</td>
</tr>
<tr>
<td>Psyllium</td>
<td>-13</td>
<td>+12</td>
</tr>
<tr>
<td>Some gums</td>
<td>-10</td>
<td>+15</td>
</tr>
<tr>
<td>Some hemicelluloses</td>
<td>-8</td>
<td>+20</td>
</tr>
</tbody>
</table>

It is also well recognized that fibre is important for normal laxation. This is due primarily to the ability of fibre to increase stool weight. The increased weight is due to the physical presence of the fibre itself, water held by the fibre, and increased bacterial mass from fermentation. Unlike in the United States, the following fibres can be used as ingredients in Canada, but according to labeling regulations, do not contribute to the total fibre value found in the Nutrition Facts table.

Fruits such as pears, apples and citrus fruits provide between 1 to 2 g of soluble fibre per 1 medium fruit.
In general, eating a healthy diet high in fibre has many proven health benefits ranging from improved digestive function to the potential to lower heart disease risk, to improved glycemic and insulinemic responses, to improved immune function and inflammatory response.

Fibre is a complex carbohydrate that the body cannot digest. In general, soluble fibres are maintained with chronic consumption. These fibres can be fermented by colonic bacteria to produce short-chain fatty acids (SCFAs), which can be beneficial for health.

### Functionality of Different Fibres and Their Effects on Human Health

<table>
<thead>
<tr>
<th>Fibre Type</th>
<th>Number</th>
<th>Number</th>
<th>Grams fibre/day</th>
<th>Weighted net</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inulin</td>
<td>4</td>
<td>24</td>
<td>365</td>
<td>-5.9</td>
</tr>
<tr>
<td>Psyllium</td>
<td>12</td>
<td>271</td>
<td>494</td>
<td>-5.5</td>
</tr>
<tr>
<td>Wheat Bran</td>
<td>24</td>
<td>11</td>
<td>109</td>
<td>-11.1</td>
</tr>
<tr>
<td>Psyllium</td>
<td>9</td>
<td>129</td>
<td>5</td>
<td>-11.1</td>
</tr>
<tr>
<td>Fructooligosaccharides</td>
<td>5</td>
<td>71</td>
<td>15</td>
<td>-13.0</td>
</tr>
<tr>
<td>Wheat dextrin</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cellulose</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### Sources

Primary sources:
- Wheat bran, some vegetables
- Psyllium, Stevia, some prebiotics
- Fructooligosaccharides, inulin, some prebiotics
- Wheat dextrin, Cellulose
- Oats, barley, fruits and vegetables

Polysaccharides are part of the food fibre category, and are not absorbed by the body. They include starch, cellulose, hemicellulose, pectin, gums and mucilages. This category of fibres helps the body in a number of ways:

- **Improved Digestion**: Fibres help with digestion by adding bulk to the diet and allowing more time for the digestive system to work effectively. This helps to keep you feeling full for longer.
- **Improved Heart Health**: Some fibres, such as psyllium, can help to lower cholesterol and reduce the risk of heart disease.
- **Improved Blood Sugar Control**: Fibres can help to slow the absorption of sugar from food, which can help to control blood sugar levels.
- **Improved Weight Management**: Fibres can help to reduce appetite by making you feel full for longer, and this can help you to manage your weight.
- **Improved Immune Function and Inflammation**: Some fibres, such as inulin, can help to improve immune function and reduce inflammation in the body.
- **Improved Bowel Health**: Fibres can help to promote regular bowel movements and can help to prevent constipation.

### Examples of Fibres

- **Soluble Fibres**: Psyllium, fructooligosaccharides, inulin, and some hemicelluloses.
- **Insoluble Fibres**: Wheat dextrin, cellulose, and some pectins.

### Conclusion

Fibre is an important part of a healthy diet. Eating a variety of fibres can help to support digestive health, heart health, blood sugar control, weight management, immune function, and overall health. It is recommended that adults eat 25-30 grams of fibre per day, although this varies depending on age, sex, and activity level. The consumption of fibre-rich foods can also help to reduce the risk of chronic diseases such as heart disease, diabetes, and colorectal cancer.

### References

3. Fast Fibre Facts: Different Fibres, Different Impact on Health
8. Slavin JL. Functional foods to sports nutrition. Dr. Slavin received B.S., M.S., and Ph.D. degrees in Nutritional Sciences from the University of Wisconsin-Madison and is a Registered Dietitian.
Soluble fibre has also been shown to decrease glycemia and insulinemia. This may be related to the viscosity of the fibre. Viscous fibres, such as psyllium, β-glucan, and pectin, may form a gel in the small intestine, which acts to delay nutrient absorption, thus slowing delivery of glucose into the bloodstream and reducing the need for insulin release.


Functionality of Different Fibres and Their Effects on Human Health

1. Dietary fibre is widely recognized as beneficial for overall human health, with a lower prevalence of coronary heart disease.

2. It is well recognized that different fibres exert different physiological effects. For example, soluble fibres such as pectin and psyllium may help to lower cholesterol, whereas insoluble fibres such as cellulose and wheat dextrin may help to promote regularity.

3. Studies have shown that higher dietary fibre intake is associated with a lower risk of cardiovascular disease, type 2 diabetes, and some types of cancer.

4. Fibre consumption can also help to improve gastrointestinal health by promoting regular bowel movements and reducing the risk of constipation and diverticulitis.

5. In scientific studies on regularity, wheat bran is generally seen as the first ingredient.

6. Wheat bran is a good source of dietary fibre, providing both soluble and insoluble fibres. It is also rich in lignin, resistant dextrins, and β-glucans.

7. In addition, short-chain fatty acids (SCFAs) such as acetate, propionate, and butyrate are produced by the fermentation of dietary fibres in the colon. These SCFAs act to delay nutrient absorption, thus slowing delivery of glucose into the bloodstream and reducing the need for insulin.

8. SCFAs also help to regulate sodium and water balance, and they may also have beneficial effects on the immune system.


12. Calame W, Weseler AR, Viebke C, Flynn C, Siemensma AD. Gum arabic establishes evidence of increased resistance to illness or infection with fibre intake. Oligofructose consumption was found to reduce febrile illness associated with diarrhea or respiratory events, and reduce antibiotic use in infants.


21. Calame W, Weseler AR, Viebke C, Flynn C, Siemensma AD. Gum arabic establishes evidence of increased resistance to illness or infection with fibre intake. Oligofructose consumption was found to reduce febrile illness associated with diarrhea or respiratory events, and reduce antibiotic use in infants.


24. Calame W, Weseler AR, Viebke C, Flynn C, Siemensma AD. Gum arabic establishes evidence of increased resistance to illness or infection with fibre intake. Oligofructose consumption was found to reduce febrile illness associated with diarrhea or respiratory events, and reduce antibiotic use in infants.


27. Calame W, Weseler AR, Viebke C, Flynn C, Siemensma AD. Gum arabic establishes evidence of increased resistance to illness or infection with fibre intake. Oligofructose consumption was found to reduce febrile illness associated with diarrhea or respiratory events, and reduce antibiotic use in infants.